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EXAMINER	
EPPERSON, JON D	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/944,083	LEFKOWITZ ET AL.	
	Examiner	Art Unit	
	Jon D. Epperson	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-26 and 44-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-26 and 44-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Application

1. The Response filed July 17, 2007 is acknowledged.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior office action.

Status of the Claims

3. Claims 7-26 and 44-51 were pending. Applicants amended claims 7 and 16. No claims were added or canceled. Therefore, claims 7-26 and 44-51 are still pending and examined on the merits.

Withdrawn Objections/Rejections

4. All rejections are maintained and the arguments are addressed below.

Maintained Rejections

Claims Rejections - 35 U.S.C. 102

5. Claims 7-10, 13, 14, 16-18, 22, 23, 25, 26, 44, 48, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation).

For ***claim 7***, Barner et al. (see entire document) disclose a method for coating

TiO_2 with biologically recognizing elements to make biosensors (e.g., see Barner et al, abstract including dsDNA), which anticipates the claimed invention. For example, Barner et al. disclose a method of producing an array of at least two different polymer ligands covalently attached to surface of substrate at two different positions (e.g., see abstract wherein dsDNA, antigens, antibodies, receptors are immobilized in two and three dimensional arrays; see also page 7, bottom wherein "non-directed" immobilization occurs affording many "different" points of attachment i.e., produces different molecules with different "substitutions" at the linking points; see also pages 12 and 14 showing different examples; see also broad language on page 5 disclosing the use of a variety of molecules for attachment without limitation on the number of molecules that could be simultaneously bound). In addition, Barner et al. disclose **(a)** providing a substrate having surface displaying olefin functional groups that consist of single site of unsaturation by contacting said surface with derivatizing composition comprising at least first silane having an olefin functional group (e.g., see page 11, last paragraph; see especially, page 17, section 1.2,wherein $Cl(CH_3)_2Si$-$(CH2)_6$-$CH=CH_2$ is disclosed; see also page 18, section 1.5). Barner et al. also disclose **(b)** converting said olefin functional groups to ligand reactive functional groups that produce covalent bonds with said at least two different polymer ligands upon contact with said ligands (e.g., see sections 2.1 and 2.2 wherein the alkene is converted into an epoxide and then to a diol; see also section 2.3 wherein the alkene is converted into an acid, both of which form covalent bonds with different polymer ligands; see also page 5, paragraphs 2-4, especially, paragraph 4, "Other molecules can be coupled to the original group X or to the group X subsequently

treated as just described to give an organic carrier layer to which the receptor molecules are bonded"). Finally, Barner et al. disclose **(c)** contacting said surface with said at least two different polymer ligands to covalently bond said at least two different polymer ligands to said surface and produce said array (e.g., see abstract wherein antigens, antibodies, receptors, dsDNA and ssDNA are disclosed; see also pages 5 and 6; see also page 7, last paragraph; "Non-directedimmobilization of a receptor molecule to the organic carrier layer signifies that ... immobilization takes place at any position on the surface of the receptor molecule [i.e., a wide variety of different molecules with different substitutions are formed]").

For ***claim 8***, Barner et al. disclose a method according to Claim 7 wherein said polymer ligands are nucleic acids (e.g., see abstract wherein ssDNA and dsDNA are disclosed).

For ***claim 9***, Barner et al. disclose a method according to Claim 7 wherein said polymer ligands are peptides (e.g., see abstract wherein antibodies are disclosed).

For ***claim 10***, Barner et al. disclose a method according to Claim 7 wherein said contacting step **(c)** comprises depositing each of said at least two different polymer ligands in different region of said surface (e.g., see abstract wherein two dimensional arrays are disclosed).

For ***claims 13, 22***, Barner et al. disclose a method according to Claim 7 wherein said ligand reactive functional group produced by said converting step (b) is an activated carboxylate ester (e.g., see section 2.3 wherein the olefins are converted into carboxylic acids; see also section 2.6 wherein the acids are converted into active esters using N-

hydroxysuccinimide).

For ***claims 14, 23***, Barner et al. disclose a method according to Claim 7 wherein said ligand reactive functional group produced by said converting step (b) is an amine (e.g., see page 5, paragraph 2 wherein the olefin is converted into a epoxide, diol, halide, dihalide or carboxylic acid etc.; see also page 12, paragraph 1 wherein the halide [i.e., produced from the olefin] is converted into an azide and then subsequently into an amine).

For ***claim 16-18***, Barner et al. disclose, in addition, to the steps set forth for claim 7, the use of nucleic acids as the polymer ligand (e.g., see abstract wherein both ssDNA and ssRNA are disclosed; see also page 3, paragraph 1; see also page 13, last paragraph).

For ***claim 25 and 26***, Barner et al. disclose an array of ligand including an array of nucleic acids produced by the method steps above (e.g., see section on claims 7 and 16 above).

For ***claim 44***, Barner et al. disclose a method according to claim 7 additionally comprising following exposure of the array to sample reading the array (e.g., see page 3, last paragraph wherein alterations in optical properties are read; see also page 2, paragraph 2; see also page 6, last paragraph; see also section 1.1).

For ***claims 48 and 49***, Barner et al. disclose a method according to Claim 7 wherein said olefin functional groups that consist of single site of unsaturation each comprise terminal $CH=CH_2$ moiety (e.g., see section 1.2 wherein $Cl(CH_3)_2Si\text{-}(CH_2)_6\text{-}CH=CH_2$ is disclosed).

Response

6. Applicant's arguments directed to the above 35 U.S.C. § 102 rejection were fully considered (and are incorporated in their entirety herein by reference) but were not deemed persuasive for the following reasons. Please note that the above rejection has been modified from it original version to more clearly address applicants' newly amended and/or added claims and/or arguments.

Applicants argue that Barner does not teach ligands "that differ by monomer sequence" covalently attached to "different and known locations" as recited in the currently amended claims (e.g., see 7/17/07 Response, pages 7-10) noting in particular that the cited passages in the rejection only indicate, "the receptor can be attached to the substrate at different positions in the receptor, e.g., a nucleic acid may be attached at its 3' or 5' end or somewhere in between" (e.g., see page 10, paragraph 1).

However, this admission that the receptor can be attached at any position on the receptor only serves to prove the Examiner's point. When the receptor is dsDNA, for example, as set forth in the abstract of Barner et al. the receptor could presumably be attached on the 5' end, 3' end, or somewhere in between for "either strand" of the dsDNA. That is "both strands" constitute the receptor. Thus, indiscriminate binding would lead to two different sequences bound to the substrate.

Furthermore, Applicants reading of Barner is far too narrow. Barner never states that only one sequence can be placed on the surface as erroneously purported. To the contrary, Barner provides a broad teaching which indicates that many different molecules can be

immobilized simultaneously. For example, Barner explicitly state that many different molecules can be immobilized including derivatives of mono or oligo0saccharides with 1-7 sugar units (e.g., see bottom of page 5). Barner never states, contrary to Applicants' assertions, that only one oligosaccharide must be applied at a time to the exclusion of any other. In addition, Barner et al. state that "multifunctional" organic layers can be produced presumably for use with multifunctional receptors because there would be no other reason to produce a multifunctional layer unless you intended to differentiate the receptors that were bound to it (e.g., see middle of page 12). Barner also provide specific examples of different sequences immobilized at different locations. For example, protein A and antibodies are immobilized on different locations in the example set forth in the middle of page 13. Likewise, aminoglycosides containing 1-5 sugar units can contain different types of receptors (or no receptors at all) depending on whether the "modified" or "non-modified" carboxylic acid functions are used. Thus, Barner et al. teach different sequences at different locations.

Accordingly, the 35 U.S.C. § 102 rejection cited above is hereby maintained.

Claim Rejections - 35 USC § 103

7. Claims 7-10, 13, 14, 16-19, 22, 23, 25, 26, 44, 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-

971).

For ***claims 7-10, 13, 14, 16-18, 22, 23, 25, 26, 44, 48, and 49***, Barner et al. teach all the limitations stated in the 35 U.S.C. 102(b) rejection above (incorporated in its entirety herein by reference), which anticipates and, as a result, renders obvious claims 7-10, 13, 14, 16-18, 22, 23, 25, 26, 44, 48, and 49. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) ("anticipation is the epitome of obviousness"); see also *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 83 (CCPA 1975); *In re Pearson*, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974).

The prior art teaching of Barner et al. differ from the claimed invention as follows:

For ***claim 19***, Barner et al. fail to teach the use of cDNA in biosensors. Barner et al. only describe the use of ssDNA and dsDNA (e.g., see abstract).

However, the combined references of Beattie et al. and Sanchez-Carbayo et al. teach the following limitations that are deficient in Barner et al.:

For ***claims 17-19***, the combined references of Sanchez-Carbayo et al. and Beattie al. (see entire documents) teach use of cDNA in biosensors (e.g., see Beattie et al., page 1; see also page 24, Part B: "Surface Immobilization of Recombinant Vector DNA, cDNA and PCR fragments; see also Example 11, "Profiling of Gene Expression using cDNA clones Arrayed in porous silicon" starting on page 32; see also Sanchez-Carbayo et al., abstract, "There are two main array-based technologies: cDNA and oligonucleotide arrays").

It would have been *prima facie* obvious to one of ordinary skill in the art at the

time the invention was made to use cDNA as disclosed by the combined references of Beattie et al. and Sanchez-Carbayo et al. in the biosensor disclosed by Barner et al. because Beattie et al., for example, explicitly state that cDNA can be used in biosensor applications such as "gene" sensing (e.g., see Beattie et al., background; see also page 19, line 20; see also page 22, line 6; see also Example 10; see also review article by Sanchez-Carbayo et al., disclosing numerous applications for cDNA arrays), which would fall within the scope of the biosensor applications disclosed by Barner et al. Furthermore, a person of ordinary skill in the art would have been motivated to use the cDNA because, according to Beattie, "numerous applications" are possible using these molecules including the "profiling of gene expression" (e.g., see Beattie et al., see also Example 11). Thus, using cDNA could expand the scope of biosensor applications. Finally, a person of ordinary skill in the art would reasonably have expected to be successful because Barner et al. state that DNA can be used in the biosensor applications including both ssDNA and dsDNA (e.g., see Barner et al., abstract), which would encompass the cDNA disclosed by defg et al. Furthermore, both defg et al. and Barner et al. state that epoxy-silanes can be used to immobilize the DNA (e.g., see Barner et al., page 5, second full paragraph; see also page 11, last paragraph; see Beattie et al., page 6, line 18; see also page 9, line 3). Sanchez-Carbayo et al. also disclose that cDNA was routinely used for microchip sensor arrays (e.g., see abstract).

In addition, for ***claims 50 and 51***, Barner et al. teach "homologs" (differs by n - CH_2- groups) of the currently claimed undecenyltrichlorodilane (e.g., see section 1.2 wherein $Cl(CH_3)_2Si$-$(CH_2)_6$-$CH=CH_2$ is disclosed i.e., is missing 3 -CH_2- groups).

However, compounds that have very close structural similarities and similar utilities are generally considered to be obvious variants (see MPEP § 2144.09 "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." In re Payne, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). See In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) and In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991)). This is especially true for "homologs", which have been presumed by the courts to be of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. In re Wilder, 563 F.2d 457, 195 USPQ 426 (CCPA 1977). Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention make the instantly claimed homologs based on the teachings Barner et al. alone. One would have been motivated to do so because homologs often have similar properties and therefore one of ordinary skill would ordinarily contemplate making them to try to obtain compounds with improved properties (i.e. to create more efficacious spacer compounds). One would have reasonably expected to be successful because Barner et al. describe the use of longer chains for attachment (e.g., see section 1.4 wherein $Cl(CH_3)_2Si\text{-}(CH_2)_{11}\text{-}COCl$ was disclosed) (emphasis added).

In addition, *assuming arguendo* that Barner et al. do not anticipate the claimed invention as set forth above (which is not the case, see above), the combined references would render obvious the "different sequences" at different locations limitation as well

because both Beattie and Sanchez teach that different sequences were routinely immobilized to a substrate surface (e.g., see Beattie et al., paragraph 1; see Sanchez et al., abstract) for the purpose of analyzing more than one receptor/ligand interaction at a time. A person of ordinary skill in the art would have been motivated to do this to increase the speed and efficiency by which interactions could be studied. Finally, a person of ordinary skill in the art would reasonably have expected to be successful because different sequences were routinely immobilized to a solid support as indicated in the above references.

Also note that optimization of process steps, especially with respect to numbers of samples analyzed or numbers of substrate regions is within the routine skill of the art. *In re Burhans*, 154 F.2d 690, 69 USPQ330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results). With respect to the repetition of steps (i.e. number of samples analyzed or number of substrate regions), see *In re Harza*, (274 F.2d 669, 124 USPQ 378 (CCPA 1960)) where the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

8. Claims 7-14, 16-23, 25, 26, 44, and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA

Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971) in further view of Zammatteo et al. (e.g., see Zammatteo et al., "Comparison between different strategies of covalent attachment of DNA to glass surfaces to build DNA microarrays" Analytical Biochemistry **2000**, *280*, 143-150) and Lukhtanov et al. (WO 01/09385 A2 (Date of Patent is **February 8, 2001**) (e.g., see 12/24/02 IDS, reference BH).

For ***claims 7-10, 13, 14, 16-19, 22, 23, 25, 26, 44, 48-51***, the combined references of Barner et al., Beattie et al., and Sanchez-Carbayo et al. teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 7-10, 13, 14, 16-19, 22, 23, 25, 26, 44, 48-51.

The prior art teaching of the combined references of Barner et al., Beattie et al., and Sanchez-Carbayo et al. differ from the claimed invention as follows:

For ***claims 11, 12, 20 and 21***, the combined references fail to disclose a method according to Claim 7 wherein said ligand reactive functional group produced by said converting step **(b)** is an aldehyde including benzaldehyde (e.g., see page 10, paragraph 1; see also page 11, last paragraph; see also page 14, paragraph 1; see also page 14, paragraph 2).

However, the combined references of Zammatteo et al. and Lukhtanov et al. teach the following limitations that are deficient in The combined references of Barner et al., Beattie et al., and Sanchez-Carbayo et al.:

For ***claims 11 and 20***, the combined references of Zammatteo et al. and Lukhtanov et al. disclose the use of aldehydes for immobilizing DNA on microarrays (e.g., see Zammatteo et al., abstract).

For ***claims 12 and 21***, the combined references of Zammatteo et al. and Lukhtanov et al. also disclose the use of benzaldehyde as a "most preferred" aldehyde for linking oligonucleotides to a solid support (e.g., see Lukhtanov et al., abstract; see also page 12, lines 13-16; see also scheme 2, formula 4).

It would have been prima facie obvious to one of ordinary skill at the time the invention was made to modify the alkene group disclosed by Barner et al. for immobilizing DNA molecules onto a solid support to an aldehyde, especially a benzaldehyde functional group, as disclosed by the combined references of Zammatteo et al. and Lukhtanov et al. because both Zammatteo et al. and Lukhtanov et al. explicitly state that an aldehyde, including a benzaldehyde, can be used for this purpose (see above). Furthermore, a person of ordinary skill in the art would have been motivated to use the aldehyde functionality because Zammatteo et al., for example, state that these functional groups are preferred for DNA (e.g., see Zammatteo et al., abstract, "We compared several coupling strategies currently used to covalently graft DNA onto a glass surface. The results indicate that fixation of aminated DNA to an aldehyde-modified surface is a choice method to build DNA microarrays"; see also Lukhtanov et al., page 12, lines 13-16). Finally, a person of ordinary skill in the art would reasonably have expected to be successful because both Zammatteo et al. and Lukhtanov et al. state that glass slides, like the ones disclosed in Barner et al., can be "easily" converted into aldehyde/acid groups for DNA immobilization with high yield (e.g., see Lukhtanov et al., page 12, abstract). Furthermore, Barner et al. explicitly state that their olefins can be converted into a wide range of functional groups (e.g., epoxide, diol, halide, acid, etc.,

see page 5, paragraph 3 of Banner et al.), which can easily be transformed into an aldehyde.

9. Claims 7-14, 16-23, 25, 26, and 44-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971) and Zammatteo et al. (e.g., see Zammatteo et al., "Comparison between different strategies of covalent attachment of DNA to glass surfaces to build DNA microarrays" Analytical Biochemistry **2000**, *280*, 143-150) and Lukhtanov et al. (WO 01/09385 A2 (Date of Patent is **February 8, 2001**) (e.g., see 12/24/02 IDS, reference BH) in further view of Achard et al. (Achard et al., "XML, bioinformatics and data integration" Bioinformatics Review **February 2001**, 17(2), 115-125).

For ***claims 7-14, 16-23, 25, 26, 44, and 48-51***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al. and Zammatteo teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 7-14, 16-23, 25, 26, 44, and 48-51.

For ***claims 45-47***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteo et al teach the use of a computer workstation to run the software for analyzing the probe array (e.g., see Sanchez-Carbayo

et al., page 950, column 2, paragraph 1; see also page 951, column 1, paragraph 1; see also page 956, column 2, paragraph 1 and Table 4 wherein virtually every aspect of the process is computer controlled).

The prior art teaching of the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteo et al. differ from the claimed invention as follows:

For ***claims 45-47***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteo et al. fail to teach the use of "forwarding" data to a "remote" location.

However, Achard teach the following limitations that are deficient in The combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al, and Zammatteo et al..:

For ***claims 45-47***, Achard teach the use of a computer and that forwarding data is particularly useful for genome projects, like the one disclosed by Beattie, including the use of DNA arrays (e.g., see Achard et al., Introduction, "it is hard to imagine how genome/biology research was conducted before the advent of the Web"; see also page 118, column 1, paragraph 2, "the European Bioinformatics Institute has also announced that hey will use XML for the storage of DNA data").

It would have been prima facie obvious to one of ordinary skill at the time the invention was made to use XML to remotely store DNA produced from the DNA arrays disclosed by the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteeo et al. because Achard et al. explicitly state that

XML can be used for this purpose (e.g., see Achard, page 118, column 1, paragraph 2). Furthermore, a person of ordinary skill in the art would have been motivated to use XML because, according to Achard et al., it is particularly effective for bioinformatics (e.g., see abstract) and it is very "user-friendly", "easy to learn", and overcomes a number of limitations with HTML (e.g., see Achard, introduction). Finally, a person of ordinary skill in the art would reasonably have expected to be successful because Achard et al. shows that it can be used for DNA array data (see above).

10. Claims 7-26 and 44-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971) and Zammatteo et al. (e.g., see Zammatteo et al., "Comparison between different strategies of covalent attachment of DNA to glass surfaces to build DNA microarrays" Analytical Biochemistry **2000**, *280*, 143-150) Lukhtanov et al. (WO 01/09385 A2 (Date of Patent is **February 8, 2001**) (e.g., see 12/24/02 IDS, reference BH) and Achard et al. (Achard et al., "XML, bioinformatics and data integration" Bioinformatics Review **February 2001**, 17(2), 115-125) in further view of Bethell et al. (Bethell et al., "Investigation of the activation of various insoluble polysaccharides with 1,1-carbonyldiimidazole and of the properties of the activated matrices" J. of Chromatogr. 1981, 219, 361-372) and Orlowska et al. (Orlowska et al., "Investigation of coupling peptides to

aminomethyl polymers" Polish Journal of Chemistry **1980**, 54, 2329-2336).

For ***claims 7-14, 16-23, 25, 26, and 44-51***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., Zammatteo, and Achard et al. teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 7-14, 16-23, 25, 26, and 44-51.

The prior art teaching of the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., Zammatteo et al., and Achard et al. differ from the claimed invention as follows:

For ***claims 15 and 24***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., Zammatteo et al., and Achard et al. fail to teach the use of imidazolyl carbamates. The combined references only teach the use of carbodiimide activation (e.g., see Zammatteo et al., page 144, column 1, paragraph 2; see also page 145, column 2, paragraph 2; see also figure 1; see also Barner et al., page 10, paragraph 1 disclosing "activation" of acids).

However, the combined references of Orlowska et al. and Bethell et al. teach the following limitations that are deficient in the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al, Zammatteo et al., and Achard et al.:

For ***claims 15 and 24***, the combined references of Orlowska et al. and Bethell et al. teach that carbonyldiimidazoles are commonly used to activate carboxylic acids in addition to carbodiimides (e.g., see Orlowska et al., abstract and Table 2; see also Bethell

et al., figure 1 wherein the "carbamate" linkage is shown upon activation).

It would have been prima facie obvious to one of ordinary skill at the time the invention was made to use carbodiimidazoles like CDI as "substitutes" for the carbodiimides or other forms of "activation" because Orloska et al. explicitly state that this can be done (e.g., see Orloska et al., abstract and table II wherein CDI is compared to DCC). Furthermore, a person of ordinary skill in the art would have been motivated to use carbonyldiimidazoles because high yield can be obtained (e.g., see Bethell et al., page 362, paragraph 1, "CDI remains the reagent of choice, particularly in terms of convenience and activation yields ... other advantages are the ease of handling of the reagent, the ability to achieve a range of substitutions under a variety of readily controlled activation conditions, and the stability of the activated product"). Finally, a person of ordinary skill in the art would reasonably have expected to be successful because Orloswka et al. explicitly state that CDI can be used as a replacement for the carbodiimides disclosed in the combined references mentioned above (e.g., see Orlowska et al., table 2).

Response

11. Applicant's arguments directed to the above 35 U.S.C. § 103(a) rejection were fully considered (and are incorporated in their entirety herein by reference) but were not deemed persuasive for the following reasons. Please note that the above rejection has been modified from it original version to more clearly address applicants' newly amended and/or added claims and/or arguments.

Applicants argue, "Barner fails to teach or suggest this required element [i.e., different sequences at different places] for the reasons set forth above" and that none of the other cited references remedies this deficiency (e.g., see 7/17/07 Response, pages 10-14)

To the extent that Applicants are merely repeating their previous arguments as set forth in the 35 U.S.C. § 102 rejection above, it is submitted that those issues were already adequately addressed above. Therefore, Barner et al. is not "deficient" in the way suggested and, as a result, Applicants' arguments are moot.

Furthermore, even if, *assuming arguendo*, Barner was "deficient" in the manner suggested by Applicants either Barner alone or when considered in combination with the other references would render obvious this disputed claim limitation because the use of more than one sequence on a solid support especially for the characterization of multiple analytes was well known in the art at the time of filing as exemplified, for example, by Beattie and Sanchez (e.g., see Beattie et al., page 1, paragraph 1, "stepwise hybridization of <u>different</u> oligonucleotide probes with arrays of DNA samples gridded onto membranes [i.e., different locations] ... hybridization of a single nucleic acid "target sequence" to an array of oligonucleotide probes tethered to a flat surface or immobilized within a thin gel matrix"; see also Sanchez, abstract).

Also note that optimization of process steps, especially with respect to numbers of samples analyzed or numbers of substrate regions is within the routine skill of the art. *In re Burhans*, 154 F.2d 690, 69 USPQ330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results). With respect to the repetition of steps (i.e. number of samples analyzed or number of substrate regions), see *In re Harza*, (274 F.2d 669, 124 USPQ 378 (CCPA 1960)) where the court held that mere

duplication of parts has no patentable significance unless a new and unexpected result is produced.

Accordingly, the 35 U.S.C. § 103(a) rejections cited above are hereby maintained.

Conclusion

Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D Epperson whose telephone number is (571) 272-0808. The examiner can normally be reached Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James (Doug) Schultz can be reached on (571) 272-0763. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jon D. Epperson/
Primary Examiner, AU 1639